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Article

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Determinants of willingness-to-pay for sustainable wine: Evidence from experimental auctions

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Abstract

The current paper explored young adult wine drinkers' willingness to pay (WTP) for three sustainable wines through Vickrey fifth-price full bidding auctions. In order to investigate factors affecting WTP the study compared the bid functions estimated with Tobit models and the premium functions estimated with ordinary least squares (OLS). The econometric results reveal that female and older respondents tend to bid higher for sustainable wines. Moreover, knowledge of specific claims increased price premiums. Our findings have significant marketing and policy implications for the promotion of sustainable wines among young adults.

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Keywords: Willingness-to-pay; Sustainable wine; Experimental auctions

1. Introduction

According to the review performed by [Christ and Burritt \(2013\)](#) key areas of environmental concern currently facing the global wine industry are: water use and quality issues, the production and management of organic and inorganic solid waste streams, energy use and the generation of greenhouse gas emissions, the use and management of chemicals in the vineyard and winery, land use issues and the impact on ecosystems. Indeed, like other food industries, the wine business has been increasingly impelled by market and regulatory drivers to assess, reduce and communicate environmental and social performances, particularly in certain countries with a shorter tradition in winemaking (Australia, New Zealand, the USA and South Africa). In addition, wine companies have realized that sustainability constitutes a means of differentiation, which is crucial for increasing productivity and competitiveness. Consequently,

sustainability has developed into a priority in the wine supply chain ([Forbes et al., 2009](#); [Gabzdylova et al., 2009](#)).

Despite the above-described scenario, the reasons behind consumers' adoption of sustainable practices, attitudes and intention to purchase sustainable wines remain largely unexplored ([Barber et al., 2010](#)). Furthermore, while many authors believe that consumers will not be willing to trade the quality of a wine off against environmental/social features ([Lockshin and Corsi, 2012](#)) – thus sustainable wines should be sold at the same price as regular wines – other scholars hold that sustainability is most likely to become a considerable competitive advantage in the international arena ([Pullman et al., 2010](#); [Forbes et al., 2009](#)). A major drawback of most of the published articles on sustainable wine is the use of contingent valuation techniques that do not capture actual behavior due to strong hypothetical bias. Indeed, unconstrained survey responses eliciting purchase intention, attitudes or product liking, used in most previous research on consumer valuation of ethical behavior, has been criticized for social desirability bias ([Auger and Devinney, 2007](#)) and the attitude–behavior gap ([Carrington et al., 2010](#)). To reduce such potential bias prominent authors recommend using specific products and incentive-compatible research methods. As previously demonstrated, auctions seem to be an effective method to obtain valid information on the perceived value of an attribute tested in the presence of external information; allowing one to know the monetary value attributed to a given label, brand or product while taking into account the economic

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constraint faced by the consumers (Lange et al., 2002). Nevertheless, this methodology has quite rarely been applied to wine (e.g. Combris et al., 2009; Lange et al., 2002; Combris et al., 2009; Sáenz-Navajas et al., 2013).

This paper draws on experimental auctions conducted in Naples (Italy) to analyze the true value attached by consumers to social and environmental claims concerning wine. In particular, the research was designed to cast light on the importance of social/ethical and environmental attributes for young adult wine drinkers (i.e. individuals consuming wine at least once a month).

The remainder of this paper is arranged as follows. The next section discusses the importance of young individuals in today's wine market. Subsequently a detailed description of the data gathering process and methods used is offered. The results of econometric analysis are then presented. Finally, our findings are discussed and compared with recent key studies, and future research avenues are outlined.

2. Research background

The wine market has experienced a huge change in geography of consumption over the last 40 years: a substantial share of total consumption has moved from large producing countries to those with a limited domestic production or none at all. Starting from the second half of the 1970s wine consumption has continuously decreased in traditional large producers in Europe and in South America (countries which used to be key consumers), and with the crisis in the Soviet Union there were sharp declines also in East and Central Europe. Meanwhile, however, starting from the 1960s consumption began to increase in Northern Europe, North America and Japan, countries which can now be considered traditional importers, and later, from the mid 1990s in countries which until that time were marginally involved with wine, namely Asia or non-producing countries in Central and South America; there was also a return to consumption in Central and Eastern Europe (Mariani et al., 2011, 2012). In traditional producing countries the decline in domestic consumption has been considered as an inevitable consequence of lifestyle changes and the wine industry has reacted by increasing its export propensity, reaching countries with a growing interest in wine (Rabobank, 2003; Anderson and Nelgen, 2011). Increased competition on international markets, however, is inducing wine industry stakeholders of the main producing countries to identify national strategies to stabilize domestic wine consumption in terms of quantity and, if possible, to increase sales. In this perspective we can frame the initiative of the Argentine parliament in the spring of 2013, which declared wine as the < national beverage > and that of the Spanish parliament which, in the same period, formed the group called Asociación Parlamentaria por la Cultura de la Viña y el Vino (APCVV) to exploit the importance of wine as a core element of Mediterranean culture.

For about two years in Italy, the main association of wine producers, the Italian Wine Union, has been encouraging academics and policy makers to study the characteristics and

expectations of Italian wine consumers with at least the same care which is applied to foreign consumers. Wine consumption in Italy started to decrease on a nationwide basis in the early 1970s. In those years, domestic consumption reached 60 million hectoliters, which corresponded to a per capita consumption of more than 100 l per year, while at the end of the first decade of the new century, consumption had stabilized at just above 20 million hectoliters, with an annual consumption of less than 40 l per capita. Reflecting a change in consumer behavior, the total amount of wine consumed by each individual has decreased but there has also been a decline in the total number of wine drinkers in Italy. The proportion of wine drinkers in the Italian population in the early 1990s was just under 60% while by 2010 it had fallen to just over 53%.

Detailed analysis of the contribution of different age classes to the change in consumption patterns shows that in recent years (2003–2010) the older age cohorts have largely contributed to this decline. Larger shares of young adults under 24 are becoming wine drinkers compared to individuals between 25 and 34 years. Even if among these young adults the proportion of daily drinkers continuously decreases – the share of occasional drinkers is increasing – wine is a product that tends to take root in the lifestyle of these individuals. Moreover, recent surveys (ISPO, 2012) indicate that in young Italians there prevails, unlike in France, Germany and the United Kingdom, a tendency to drink alcoholic beverages responsibly, and this would appear to reward wine consumption.

From a marketing perspective it is therefore extremely important to exploit these signals and strengthen the relationship between wine and the younger generation in order to bring about conditions for consumption growth. To achieve this it is of paramount importance to characterize the image of the product consistently with the issues to which the younger generation appears to be more sensitive.

In the last decade in many producer countries, the wine industry has devoted considerable resources to the identification of pathways to adapt production processes to the principles of sustainable development and the establishment of protocols for the evaluation of sustainability behavior. This is also happening in Italy and it is consequently interesting to ascertain to what extent the issue of sustainability can be useful to contribute to the embedding of wine consumption among the younger generation. Sustainability appears to be a potentially useful issue as younger generations seem to be particularly sensitive to this topic (UNEP, 2011). It has been demonstrated that the so-called Millennials care more compared to other cohorts about the environmental impact of the wine industry (MacDonald et al., 2013; Thach and Olsen, 2006). On the other hand, interest in sustainability does not automatically translate into purchases of sustainable food (Vermeir and Verbeke, 2006), as other factors strongly impact behavior.

As a result, in order to understand to what extent the issue of sustainability can actually be useful to strengthen the relationship between wine and Italian young adults, and also as a marketing tool, it is necessary to analyze in depth the attitude of young Italians towards sustainability attributes of wine.

3. Methodology

For the purposes of our research experimental auctions were adopted due to their ability to induce each bidder to reveal his or her truthful value for the good (Lusk and Shogren, 2007). Participants were recruited among undergraduates in the city of Naples, Italy.¹ The only requirements were to be a wine consumer (at least once a month) and to be aged among 18 and 35. The data were collected between winter 2012 and summer 2013. In all, eight sessions were held, with 10 participants in each session ($n=80$). Participants were paid €10 for one and a half hours of their time and received an ID number. Each session started with two training auctions (with potato chips and a chocolate snack) where participants were encouraged to ask questions and expose potential uncertainties (see Box 1 below for details).

Respondents were asked to complete a short questionnaire after finishing the auction. Information was collected on socio-demographics, lifestyle, attitudes towards the environment and society, wine consumption habits and knowledge of sustainability practices and specific wine labels. Since no comprehensive sustainability label for wine is available on the Italian market, we asked respondents to bid on four different products: a conventional wine, a wine with a carbon neutral logo showing a green footprint with the writing CO₂, a wine including a Libera Terra logo and a wine with the Wine for Life logo (see Box 2 for a detailed description of the specific meanings of the logos).

Each bottle of wine (0.75 l) with the sustainable logo carried a brief explanation of its meaning and purpose. All four wines had the same general information: geographical indication (PGI Sicily), vintage (2011), and type (red). No additional information on brand, varietal grapes used, sensory characteristics or actual market price was given to respondents (see Fig. 1). No reference price was given to respondents since previous scholars have demonstrated that provision of reference or field price information influences bid values in experimental auctions (Drichoutis et al., 2008; Corrigan and Rousu, 2006). The full bidding approach was used (i.e. asking participants to bid on all the products) as several studies agree that subjects tend to value the auctioned products more in the endowment procedure (Lusk et al., 2004; Corrigan and Rousu, 2006; Gracia et al., 2011). Finally, ordering effect was resolved through randomization. In the training auctions we posted prices to explain the auction mechanism, but during the wine auctions we did not reveal any bidding information.

Based on the second-price Vickrey auction methodology (Vickrey, 1961), an experimental valuation process using a fifth-price auction was developed. The choice of the fifth highest bid makes it possible to increase the number of participants in the transaction, and hence increase the degree of involvement in the auction of those individuals who attribute low values to the products on sale. As noted by Lusk et al. (2004), this type of auction combines the

Box 1

Overview of the experimental procedure.

Step 1: All students signed a consent form and a form committing them to buy the wine if they won the auction.

Step 2: Participants were fully briefed on the procedure of the auction method using a PowerPoint presentation and a script where a short example on how bids are sorted in descending order and on how the 5th highest bid and the winner are selected. Also, a numerical example was given to show respondents why it is in their best interest to bid exactly the amount the product is worth to them.

Step 3: Two training auctions were conducted using potato chips and a chocolate snack.

Step 4: Participants were handed out the four wine bottles to look closely for differences and information cues.

Step 5: The fifth-price auction was performed with five rounds.

Step 6: Participants completed a questionnaire.

Step 7: Each participant went to the cashier and received €10 for taking part in the auction minus eventual payment for winning.

Box 2

Label explanation.

Carbon neutral indicates that all of the greenhouse gases released during wine production, packaging and delivery have been reduced to zero, making this a wine which does not impact negatively on climate change.

Centopassi - Libera Terra is a label used to commercialize wines produced by Libera Terra Cooperatives that only use land confiscated from the criminal organization (Mafia) in the Upper Belice Corleonese area (Trapani and Agrigento provinces, Sicily).

Wine for Life is an initiative of the Community of Sant'Egidio, which through a label on the wine bottle indicates the winery's commitment to social responsibility. Specifically, producers pay half a euro for each label, all proceeds being used to combat AIDS in Africa.

¹Depositario et al. (2009) demonstrated that there is no significant difference between bidding behavior of students and non-students.

advantages of second-price and random n th-price auctions. Furthermore, Lusk et al. (2007) demonstrated that if the number of participants who could purchase the product is approximately



Fig. 1. Labels used in the experimental auctions.

half the session, all bidders would generally be more engaged. We made it clear to the subjects that only one round and one product would be binding, to avoid demand reductions and wealth effects (Shogren et al., 1994). All data were analyzed with STATA statistical software (version 11.0).

We are interested in the factors affecting WTP for wines with different attributes. Hence the dependent variable in our model is the average WTP bid for a given subject for each of the products. Given the nature of the data we used a Tobit (Tobin, 1958) model to analyze the bidding behavior for B_i^w ($i=1, 2, 3$, and 4)². As our interest is in terms of the main

effects we ignored possible interactions. In order to determine which estimation method was most appropriate between Tobit and double hurdle, we followed Lusk and Shogren (2007) and calculated a likelihood ratio statistic.

In general, the Tobit model can be expressed as

$$y_i^* = \beta'x_i + u_i, \quad u_i \sim N(0, \sigma^2)$$

$$y_i = y_i^* \text{ if } y_i^* > 0 \text{ or } 0 \text{ if } y_i^* \leq 0$$

Therefore the expected willingness to pay for consumer i can be computed as

$$E(y_i^*) = E(y_i | y_i > 0) \times f(y_i | y_i > 0) + E(y_i | y_i = 0) \times F(y_i = 0)$$

²Respectively the four wines are conventional, carbon neutral, Libera Terra and Wine for Life.

$$\begin{aligned}
 &= [x'\beta + \sigma\lambda(\beta'x/\sigma)] \times \Phi\left(\frac{\beta'xi}{\tilde{\sigma}}\right) + 0 \\
 &= \beta'x_i\Phi\left(\frac{\beta'xi}{\tilde{\sigma}}\right) + \sigma\Phi\left(\frac{\beta'xi}{\tilde{\sigma}}\right)
 \end{aligned}$$

where the inverse Mills ratio $\lambda(\beta'x/\sigma)$ is equal to $\varphi(\beta'x/\sigma)/\Phi(\beta'x/\sigma)$ and the marginal effect for the continuous variable x_j is

$$\frac{\partial E(y_i)}{\partial x_j} = \Phi\left(\frac{\beta'xi}{\tilde{\sigma}}\right)\beta_j$$

In particular, the independent variables are participants' socio-demographic and lifestyle characteristics, consumption frequency of wine and other alcoholic beverages, sustainability knowledge and concern. For bid premiums (Carbon neutral bid – conventional bid, Libera Terra bid – conventional bid, and Wine for Life bid – conventional bid) we applied the ordinary least squares method (OLS), as premiums can be positive or negative.

4. Results

Due to the specific features of our sample (only undergraduates) several common socio-demographic characteristics were not surveyed since they would not have added useful insights into the respondents' profile (marital status, average annual income, responsibility in everyday food shopping, etc.). [Table 1](#) provides a summary of the independent variable means and standard deviations; 60% of the participants were female, 70% lived in non-urban settings, and the average age was slightly above 23 years. Only 14% of respondents can be considered high consumers of wine (more than twice a week); similarly, consumption per week frequencies for beer, spirits and alcopops were quite low. The main site of wine consumption was away from home (82%). Taking into account participants' concern for sustainability in everyday food shopping, 44% stated they cared. Similar outcomes were found when it came to “caring about environmental sustainability in wine shopping” (49%), while far fewer were concerned about social sustainability in wine shopping (22%). Knowledge of the three labels was quite low: on a scale from 0 to 4 carbon neutral received 1.66 points, followed by Wine for Life with 1.24 and Libera Terra with 1.21.

As reported in [Fig. 2](#), mean bids for the four wines (considering all five rounds) vary quite widely, as WTP for the conventional wine is €2.50 while WTP for Wine for Life is over 57% higher, reaching €3.93. Carbon-neutral wine WTP is €3.24 whereas Libera Terra wine was valued by respondents at €3.08. All the average differences between conventional wine mean bids and the other three wines are statistically significant according to the Wilcoxon signed-rank test ($p < 0.001$).

[Table 2](#) reports parameter estimates of bid regressions for the four wines considered using all data, i.e. since there are 80 respondents and each of them bid five times, these regressions are based on 400 observations. For the Carbon Neutral wine, the Tobit results in the second column show that six out of 14 estimated parameters are statistically significant: age, gender, wine consumption frequency, caring about sustainability in everyday food shopping, caring about environmental sustainability in wine

shopping and knowledge of the specific label. These same variables also explain WTP for Wine for Life and Libera Terra (with the notable exception of knowledge of the label). It is also important to point out that gender and wine consumption frequency are variables also affecting WTP for conventional wine.

To further explore respondents' attitudes toward the sustainable wines we applied OLS regression to understand factors underlying the price premium assigned to these products (Δ WTP sustainable wine – conventional wine). As shown in [Table 3](#) the significant variables explaining all price premiums for all products are: age, gender, wine consumption frequency and caring about sustainability in everyday food shopping. Interestingly, caring about wine sustainability is statistically significant for the carbon neutral wine and wine for life premiums, but not for the Libera Terra wine. Similarly, knowledge of the specific label impacts price premiums only for carbon neutral and Wine for Life. In particular, the estimated coefficients for age show that older participants tend to bid higher for the three sustainable wines; similarly, females reveal higher WTPs for these wines. No other variables considered appear to have a significant influence on WTP premiums.

5. Discussion and conclusion

As noted by [Schmit et al. \(2013\)](#), at present the wine industry's sentiment is that consumers consider organic wine an inferior product while eco-certifications might grant broader benefits that go beyond price premium.³ Indeed, this idea would appear to be substantiated by several studies: [Loureiro \(2003\)](#) estimated that Colorado environmentally friendly wines receive a small premium compared to conventional wines. Similarly, [Bazoche and colleagues \(2008\)](#) proved that wines with environmental characteristics do not seem to be valued more highly than traditional Bordeaux. Moreover, [Delmas and Grant \(2010\)](#) showed that eco-labeling has a negative impact on prices for organic California wines, while there is a price premium associated with eco-certification. Furthermore, previous papers have also revealed that consumers' level of environmental knowledge influences their willingness to purchase more environmentally friendly wines ([Barber et al., 2009](#)); whereas other scholars ([Brugarolas et al., 2005](#)) show that consumers with healthier lifestyles tend to pay higher prices for organic wines. Recent findings of [Mueller and Remaud \(2013\)](#) reveal that marginal WTP for environmentally responsible claims is about three times as high as for the specific socially responsible claim;⁴ and while the WTP for environmental responsibility is non-negative across all the investigated markets, it is negative for the socially responsible claim in France and Francophone Canada.

Alongside the above-portrayed market scenario, wineries in the New World seem to be currently more sensitive to environmental and social issues connected to wine production

³It is important to highlight that this is particularly true for New World producers. European wineries may have a different view.

⁴The authors used a social fairness label, depicting stylized persons reaching out to each other around the globe.

Table 1
Independent variables, included in the estimation models, means and standard deviations ($N=80$).

Variable Name	Mean	SD	Variable coding
Age	23.3	3.8	Age in years
Gender	0.60	0.47	0= male, otherwise 1
Area of residence	0.71	0.41	0=urban, otherwise 1
Wine consumption frequency per week	1.14	1.07	1=less than twice, 2=2 or 3 times, 3=4 or more times
Wine consumption location (main)	0.18	0.43	0=at home, otherwise 1
Beer consumption frequency per week	1.67	1.92	1=less than once, 2=1 or 2 times, 3=3 or more times
Spirits consumption frequency per week	1.13	0.47	1=less than once, 2=1 or 2 times, 3=3 or more times
Alcopops consumption frequency per week	1.09	0.56	1=less than once, 2=1 or 2 times, 3=3 or more times
Caring about sustainability in everyday food shopping	0.44	0.42	1=very important and important, otherwise 0
Caring about sustainability in everyday non-food shopping	0.83	0.44	1=very important and important, otherwise 0
Caring about environmental sustainability in wine shopping	0.51	0.48	1=very important and important, otherwise 0
Caring about social sustainability in wine shopping	0.22	0.39	1=very important and important, otherwise 0
Knowledge of CN label	1.66	1.24	0–4 (1=low, 4=high)
Knowledge of LT label	1.21	1.10	0–4 (1=low, 4=high)
Knowledge of WFL label	1.24	1.37	0–4 (1=low, 4=high)

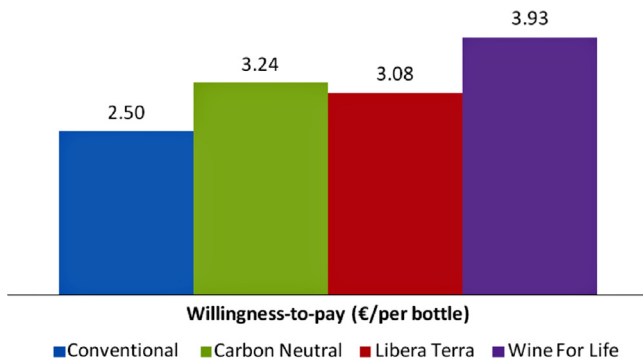


Fig. 2. Overview of mean bids per auctioned wine.

processes (Cholette et al., 2005). In addition, the literature is somewhat conflicting on the importance for Millennials of environmental and social issues in the wine sector (MacDonald et al., 2013; Thach and Olsen, 2006).

Our results indicate that consumers value sustainability attributes of wine positively. This result is robust across all the products auctioned, as WTPs for all three sustainable wines were significantly higher. The average premium that young individuals were willing to pay for a sustainable wine ranges between 23% and 57% of the average price of the conventional wine, depending on what feature is considered (social, environmental or solidarity). Moreover, age, gender, wine consumption frequency and caring about sustainability in everyday food shopping significantly affect these premiums. Particularly notable is the outcome that female and older respondents tend to bid higher for the three wines considered sustainable.

Our findings should prove particularly useful for marketers and entrepreneurs since studies that compare different sustainable aspects of wine are particularly scant and no research has so far focused on young individuals. In addition, the young adult cohort is an attractive segment for multinational firms across the globe, particularly in emerging markets (Douglas and Craig, 2006; Kjeldgaard and Askegaard, 2006; Thach and

Olsen, 2006). This article also contributes to the growing literature on consumer valuation of sustainable labels for foods (e.g. McCluskey et al., 2009; Annunziata et al., 2011; Vecchio and Annunziata, 2013).

In addition, this research provides a number of insights into the characteristics of young wine consumers in Italy and, to the extent that these findings apply more generally, it contributes to a very limited European literature. However, there are several limitations inherent in this type of study, a few of which are worth mentioning. First and foremost there are strong social desirability issues (Fisher and Katz, 2000), as respondents often seek to satisfy social norms rather than reveal their true preferences. Furthermore, the decision to include in the research only three wines with particular social, ethical or environmental features may have an impact on overall findings (the addition of other certifications may influence specific WTPs, such as the organic label). The final number of subjects involved in the experimental treatments was quite limited ($n=80$). Though this is an acceptable sample size in the literature, it would lend more credibility if we had a larger sample. Additionally, for our convenience we recruited only undergraduate students, while involving young adult consumers in general (older and responsible for household food shopping) and in a real market environment (i.e. supermarket or wine store) could have ensured a stronger representativeness of actual wine shoppers (even if in the literature there are contrasting opinions, (see Chang et al., 2009; Depositario et al., 2009)). Moreover, the specific characteristics of the auction protocol, the Vickrey methodology, the absence of price references and non-earned rewards (e.g. Vecchio and Pomarici, 2013), undoubtedly influenced respondents.

Overall, there are several straightforward extensions of the current work. For example, our focus was on the young adult cohort, but further research on the entire Italian population of wine shoppers would provide useful insights about differences in WTP behavior and attitudes toward sustainability issues. Furthermore, a comparison with young wine drinkers of dissimilar countries with different consumption habits and food traditions

Table 2
Tobit parameter estimates on bids for the four auctioned wines.

Variable	Conventional	Carbon Neutral	Libera Terra	Wine For Life
Constant	1.71	1.43	1.22	1.84
Age	1.85	2.43*	2.22	3.89**
Gender	0.28***	0.36**	0.49**	0.51***
Urban	0.18	0.16	0.12	0.20
Wine consumption frequency	0.21**	0.13**	0.28**	0.71***
Wine consumption location	0.41	0.32	0.09	0.68
Beer consumption frequency	0.03	0.35	0.07	0.61
Spirits consumption frequency	−0.76	−0.65	−0.43	−0.52
Alcopops consumption frequency	−0.04	−0.61	−0.08	−0.23
Caring about sustainability in everyday food shopping	0.30	0.66***	0.43***	0.49**
Caring about environmental sustainability in wine shopping	0.74	0.48**	0.60**	0.02**
Caring about social sustainability in wine shopping	0.12	0.90	0.54	0.02
Knowledge of CN label	0.11	0.26**	0.8	0.76
Knowledge of LT label	0.17	0.22	0.18	0.07
Knowledge of WFL label	0.15	0.24	0.19	0.33**
Likelihood-ratio χ^2 (14)	202***	209***	218***	206***
Number of observations	400	400	400	400

*Significance level reported in Tobit models $p < 0.1$.

**Significance level reported in Tobit models $p < 0.05$.

***Significance level reported in Tobit models $p < 0.01$.

Table 3
OLS regression results on premiums.

Variable	Premium (CN-Con)	Premium (LT-Con)	Premium (WFL-Con)
Constant	0.11	0.18	0.27
Age	0.21**	0.12**	0.28**
Gender	0.27***	0.13***	0.31***
Urban	0.05	0.16	0.11
Wine consumption frequency	0.19**	0.18*	0.23**
Wine consumption location	−0.12	−0.17	−0.01
Beer consumption frequency	−0.05	−0.06	−0.13
Spirits consumption frequency	−0.08	−0.02	−0.07
Alcopops consumption frequency	0.12	0.09	0.08
Caring about sustainability in everyday food shopping	0.18*	0.07*	0.11*
Caring about environmental sustainability in wine shopping	0.44**	0.34	0.42**
Caring about social sustainability in wine shopping	0.09	0.03	0.11
Knowledge of CN label	0.27**	0.08	0.16
Knowledge of LT label	0.06	0.03	0.01
Knowledge of WFL label	0.07	0.19	0.12*
Log Likelihood	−1104.95	−1292.63	−1585.62
N	400	400	400

*Significance level reported in OLS models $p < 0.1$.

**Significance level reported in OLS models $p < 0.05$.

***Significance level reported in OLS models $p < 0.01$.

would also be of interest and could yield divergent findings. Future research should try to replicate our experiment using other mechanisms to test the robustness of our findings, particularly when other cues are included in the valuation scenario (such as peers' opinions, shopping environment, public campaigns, and third-party certifications). Finally, integrating sensory evaluation of the products in this type of experiment appears particularly important since previous research demonstrated that quality aspects and sensory evaluation dominate all other extrinsic environmental factors (Schmit et al., 2013).

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References

- Anderson, K., Nelgen, S., 2011. Wine's Globalization: New Opportunities, New Challenges. Working Paper No. 0111, Wine Economics Research Centre, University of Adelaide, June.

- Annunziata, A., Pascale, P., Ianuario, S., 2011. Consumers' attitudes toward labelling of ethical products: The case of organic and fair trade products. *J. Food Prod. Mark.* 17 (5), 518–535.
- Auger, P., Devinney, T.M., 2007. Do what consumers say matter? The misalignment of preferences with unconstrained ethical intentions. *J. Bus. Eth.* 76 (4), 361–383.
- Barber, N., Taylor, D.C., Deale, C.S., 2010. Wine tourism, environmental concerns, and purchase intention. *J. Travel Tour. Mark.* 27 (2), 146–165.
- Barber, N., Taylor, C., Strick, S., 2009. Wine consumers' environmental knowledge and attitudes: influence on willingness to purchase. *Int. J. Wine Res.* 1, 59–72.
- Bazoche, P., Deola, C., Soler, L.G., 2008. An Experimental Study of Wine Consumers' Willingness to Pay for Environmental Characteristics. Selected Paper, 12th Congress of the European Association of Agricultural Economists, Ghent, Belgium.
- Brugarolas Molla-Bauza, M., Martinez-Carrasco Martinez, L., Martinez Pveda, A., Rico Perez, M., 2005. Determination of the surplus that consumers are willing to pay for an organic wine. *Span. J. Agric. Res.* 3, 43–51.
- Carrington, M., Neville, B., Whitwell, G., 2010. Why Ethical consumers don't walk their talk: towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers. *J. Bus. Eth.* 97 (1), 139–158.
- Chang, J., Lusk, J., Norwood, F., 2009. How closely do hypothetical surveys and laboratory experiments predict field behavior? *Am. J. Agric. Econ.* 91 (1), 518–534.
- Christ, K.L., Burritt, R.L., 2013. Critical environmental concerns in wine production: an integrative review. *J. Clean. Prod.* 53, 232–242.
- Cholette, Susan, Richard Castaldi, April Frederick, 2005. Globalization of the Wine Industry: Implications for Old and New World Producers. International Business and Economy Conference Proceedings. January.
- Combris, P., Bazoche, P., Giraud-Héraud, E., Issanchou, S., 2009. Food choices: What do we learn from combining sensory and economic experiments? *Food Qual. Preference* 20 (8), 550–557.
- Corrigan, J.R., Rousu, M.C., 2006. Posted prices and bid affiliation: Evidence from experimental auctions. *Am. J. Agric. Econ.* 88 (4), 1078–1090.
- Delmas, M.A., Grant, L.E., 2010. Eco-labeling strategies and price-premium: the wine industry puzzle. *Bus. Soc.* (published online 11 March 2010).
- Depositario, D., Nayga Jr., R., Wu, X., Laude, T., 2009. Should students be used as subjects in experimental auctions? *Econ. Lett.* 102, 122–124.
- Douglas, S.P., Craig, C.S., 2006. On improving the conceptual foundations of international marketing. *J. Int. Mark.* 14 (1), 1–22.
- Drichoutis, A., Lazaridis, P., Nayga, R.M., 2008. The role of reference prices in experimental auctions. *Econ. Lett.* 99 (3), 446–448.
- Fisher, R.J., Katz, J.E., 2000. Social-desirability bias and the validity of self reported values. *Psychol. Mark.* 17, 105–120.
- Forbes, S.L., Cohen, D.A., Cullen, R., Wratten, S.D., Fountain, J., 2009. Consumer attitudes regarding environmentally sustainable wine: an exploratory study of the New Zealand marketplace. *J. Clean. Prod.* 17 (13), 1195–1199.
- Gabzdylova, B., Raffensperger, J.F., Castka, P., 2009. Sustainability in the New Zealand wine industry: drivers, stakeholders and practices. *J. Clean. Prod.* 17, 992–998.
- Gracia, A., Loureiro, M., Nayga, R.M., 2011. Valuing an EU animal welfare label using experimental auctions. *Agric. Econ.* 42, 669–677.
- ISPO-Federvini (2012). *I Giovani e la Cultura del Bere*.
- Kjeldgaard, D., Askegaard, S., 2006. The globalization of youth culture: the global youth segment as structures of common difference. *J. Consum. Res.* 33, 231–247.
- Lange, C., Martin, C., Chabanet, C., Combris, P., Issanchou, S., 2002. Impact of the information provided to consumers on their willingness to pay for Champagne: comparison with hedonic scores. *Food Qual. Preference* 13 (7), 597–608.
- Lockshin, L., Corsi, A.M., 2012. Consumer behaviour for wine 2.0: a review since 2003 and future directions. *Wine Econ. Policy* 1, 2–23.
- Loureiro, M.L., 2003. Rethinking new wines: Implications of local and environmentally friendly labels. *Food Policy* 28, 547–560.
- Lusk, J., Feldkamp, T., Schroeder, T., 2004. Experimental auction procedure: impact on valuation of quality differentiated goods. *Am. J. Agric. Econ.* 86, 389–405.
- Lusk, J.L., Alexander, C., Rousu, M.C., 2007. Designing experimental auctions for marketing research: the effect of values, distributions, and mechanisms on incentives for truthful bidding. *Rev. Mark. Sci.* 5 (3) (Article 3).
- Lusk, J.L., Shogren, J.F., 2007. *Experimental Auctions: Methods and Applications in Economic and Marketing Research*. Cambridge University Press, Cambridge, UK.
- MacDonald, J.B., Saliba, A.J., Bruwer, J., 2013. Wine choice and drivers of consumption explored in relation to generational cohorts and methodology. *J. Retailing Consum. Serv.*, 349–357.
- Mariani, A., Napolitano, F., Pomarici, E., 2011. Small wine-importing countries: dynamic and competitive performance of suppliers. *Le Bull. de l'OIV* 84, 968–970.
- Mariani, A., Pomarici, E., Boatto, V., 2012. The international wine trade: recent trends and critical issues. *Wine Econ. Policy* 1, 24–40.
- McCluskey, J.J., Durham, C.A., Horn, B.P., 2009. Consumer preferences for socially responsible production attributes across food products. *Agric. Resour. Econ. Rev.* 38, 345–356.
- Mueller, S., Remaud, H., 2013. Impact of corporate social responsibility claims on consumer food choice: a cross-cultural comparison. *Br. Food J.* 115 (1), 142–166.
- Pullman, M.E., Maloni, M.J., Dillard, J., 2010. Sustainability practices in food supply chains: how is wine different? *J. Wine Res.* 21 (1), 35–56.
- Rabobank, 2003. *Wine is Business: Shifting Demand and Distribution: Major Drivers Reshaping the Wine Industry: F&A Review*. Rabobank International.
- Sáenz-Navajas, M.P., Campo, E., Sutan, A., Ballester, J., Valentin, D., 2013. Perception of wine quality according to extrinsic cues: The case of Burgundy wine consumers. *Food Qual. Preference* 27 (1), 44–53.
- Schmit, T.M., Rickard, B.J., Taber, J., 2013. Consumer valuation of environmentally friendly production practices in wines, considering asymmetric information and sensory effects. *J. Agric. Econ.* 64 (2), 483–504.
- Shogren, J.F., Shin, S.Y., Hayes, D.J., Kliebenstein, J.B., 1994. Resolving differences in willingness to pay and willingness to accept. *Am. Econ. Rev.* 84, 255–270.
- Tlach, L., Olsen, J.E., 2006. Market segment analysis to target young adult wine drinkers. *Agribusiness* 22 (3), 307–322.
- Tobin, J., 1958. Estimation of relationships for limited dependent variables. *Econometrica* 26 (1), 24–36.
- UNEP, 2011. *Visions for Change – Recommendations for Effective Policies on Sustainable Lifestyles*.
- Vecchio, R., Annunziata, A., 2013. Consumer attitudes to sustainable food: a cluster analysis of Italian university students. *New MeditMediterr. J. Econ., Agric. Environ.* 12 (2), 47–55.
- Vecchio, R., Pomarici, E., 2013. An empirical investigation of rewards' effect on experimental auctions outcomes. *Appl. Econ. Lett.* 20 (14), 1298–1300.
- Vermeir, I., Verbeke, W., 2006. Sustainable food consumption: exploring the consumer attitude-behaviour intention gap. *J. Agric. Environ. Eth.* 19, 169–194.
- Vickrey, W., 1961. Counter speculation, auctions, and competitive sealed tenders. *J. Finance* 16, 8–37.